Claims

[1] 1. A silicon crystallization system comprising:
a plurality of beam generators generating laser beams;
an optical unit controlling a synthesized beam formed by synthesizing the laser beams from the beam generators to generate an output beam; and
a stage mounting a substrate provided with a silicon layer to be polycrystallized by the output beam from the optical unit.

[2] 2. The system of claim 1, wherein a duration of the synthesized beam is longer than each of the laser beams generated by the beam generators.

[3] 3. The system of claim 2, further comprising a beam synthesizer generating the synthesized beam.

[4] 4. The system of claim 1, further comprising a chamber provided with the optical unit and the stage therein.

[5] 5. The system of any one of claims 1 to 4, wherein the silicon layer comprises an amorphous silicon layer.

[6] 6. A silicon crystallization system comprising:
a plurality of beam generators generating laser beams;
a beam splitter splitting a synthesized beam formed by synthesizing the laser beams from the beam generators into a plurality of beamlets;
a plurality of optical units controlling the beamlets from the beam splitter; and
a plurality of stages for mounting substrates provided with silicon layers to be polycrystallized by the beamlets from the optical units.

[7] 7. The system of claim 6, wherein a duration of the synthesized beam is longer than each of the laser beams generated by the beam generators.

[8] 8. The system of claim 6, further comprising a beam synthesizer generating the synthesized beam.

[9] 9. The system of claim 6, further comprising a plurality of chambers, each chamber provided with one of the optical units and one of the stages therein.

[10] 10. The system of claim 9, wherein one of the chambers loads a substrate while another of the chambers performs polycrystallization.

[11] 11. The system of claim 9, wherein at least two of the chambers simultaneously performs polycrystallization.

[12] 12. The system of claim 10 or 11, wherein the polycrystallization comprises sequential lateral solidification (SLS).

[13] 13. The system of claim 10 or 11, wherein the number of the chambers is three.

[14] 14. The system of claim 10 or 11, wherein the chambers perform the polycrystallization in turn.

[15] 15. The system of any one of claims 6 to 11, wherein the silicon layer comprises an amorphous silicon layer.

[16] 16. A silicon crystallization system comprising:
a beam generator generating a laser beam;
a beam splitter splitting the laser beam from the beam generator into a plurality of beamlets; and
a plurality of chambers, each chamber including an optical unit controlling one of the beamlet from the beam splitter and a stage for mounting a substrate provided with a silicon layer to be polycrystallized by the beamlet from the optical unit.

[17] 17. The system of claim 16, wherein one of the chambers loads a substrate while another of the chambers performs polycrystallization.

[18] 18. The system of claim 16, wherein at least two of the chambers simultaneously perform polycrystallization.

[19] 19. The system of claim 17 or 18, wherein the polycrystallization comprises sequential lateral solidification (SLS).

[20] 20. The system of claim 17 or 18, wherein the chambers perform the polycrystallization in turn.

[21] 21. A silicon crystallization method comprising:
splitting a first laser beam into a plurality of beamlets;
loading a first substrate provided with a first amorphous silicon layer into a first chamber;
crystallizing the first amorphous silicon layer with one of the beamlets in the first chamber;
loading a second substrate provided with a second amorphous silicon layer into a second chamber during the crystallization of the first amorphous silicon layer; and
crystallizing the second amorphous silicon layer with another of the beamlets in the second chamber.

[22] 22. The method of claim 21, further comprising:
loading a third substrate provided with a third amorphous silicon layer into the third chamber during the crystallization of the second amorphous silicon layer;

unloading the first substrate from the first chamber during the crystallization of the second amorphous silicon layer; and

crystallizing the third amorphous silicon layer with one of the beamlets in the third chamber.

[23] 23. The method of claim 22, further comprising:

generating a plurality of second laser beams; and

synthesizing the second laser beams to form the first laser beam.

[24] 24. A silicon crystallization method comprising:

splitting a first laser beam into first to third beamlets;

loading a first substrate provided with a first amorphous silicon layer into a first chamber;

crystallizing the first amorphous silicon layer with the first beamlet in the first chamber;

loading a second substrate provided with a second amorphous silicon layer into a second chamber;

crystallizing the second amorphous silicon layer with the second beamlet in the second chamber;

loading a third substrate provided with a third amorphous silicon layer into the third chamber; and

crystallizing the third amorphous silicon layer with the third beamlet in the third chamber,

wherein the loading of the third substrate is performed during the crystallization of the first amorphous silicon layer or the crystallization of the third amorphous silicon layer.

[25] 25. The method of claim 24, further comprising:

generating a plurality of second laser beams; and

synthesizing the second laser beams to form the first laser beam.

[26] 26. The method of claim 24, wherein a duration of the crystallization of the first amorphous silicon layer overlaps a duration of the crystallization of the third amorphous silicon layer are simultaneously performed.

[27] 27. The method of claim 26, wherein the crystallization of the first amorphous silicon layer is completed before completion of the crystallization of the third amorphous silicon layer.